

Adding coronary calcium score to traditional risk factors improves risk assessment for heart disease

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Including a coronary artery calcium score in a risk assessment for future heart disease events, such as heart attacks, provides a better estimate in some populations than a standard coronary risk factors assessment, according to research supported by the National Heart, Lung, and Blood Institute (NHLBI), part of the National Institutes of Health.

A [coronary artery calcium](#) score was most helpful for people considered to be at intermediate risk of a heart disease - defined as those with a 3 to 10 percent chance of developing heart disease over the next five years - according to the report in the April 28 issue of the [Journal of the American Medical Association](#).

In the Multi-Ethnic Study of Atherosclerosis (MESA), researchers used cardiac CT scans, which detect specks of calcium in the walls of the coronary arteries. These specks, indicating calcifications, are an early sign of [coronary artery disease](#), or heart disease. Heart disease is the leading cause of heart attacks, angina (chest pain) and death in the United States.

"This study adds to our knowledge about the possible use of a coronary calcification scan to improve prediction of a patient's risk of heart disease, especially in individuals considered at intermediate, or moderate, risk of heart disease," said NHLBI Acting Director Susan B. Shurin, M.D. "However, further evidence is needed to know whether using this test will actually change the course of heart disease and improve patient outcomes."

The study drew from 5,878 MESA participants, ages 45 to 84, who initially did not have known cardiovascular disease, and included both men and women who were white, African-American,

Hispanic, or of Chinese heritage. Interviewers telephoned participants or a family member at intervals of nine to 12 months to inquire about interim hospital admissions, diagnoses of cardiovascular disease, and deaths.

Participants were followed for almost six years. Over the follow-up period, 209 participants experienced a heart disease event, such as heart attack, death from heart disease, or cardiac arrest.

Using the coronary artery calcium score in addition to standard risk factors accurately placed 77 percent of the overall population into the highest or lowest risk categories, compared to only 69 percent assessed with traditional risk factors alone.

The risk assessment with the coronary calcium score reclassified a notable proportion of participants to a more accurate risk classification. An additional 23 percent of those who experienced events were reclassified to high risk, and an additional 13 percent who did not experience an event were appropriately reclassified to low risk.

Risk classifications were created using risk factors from the Framingham Heart Study Risk Score and based upon the risk of having a heart attack or dying from heart disease within five years. Risk factors considered were age, gender, tobacco use, systolic blood pressure (the top number in a blood pressure reading), blood pressure medication use, blood cholesterol levels, and ethnicity. Individuals with less than a 3 percent chance of heart disease in the next five years were considered to be low-risk; those with a 3 to 10 percent chance to be intermediate-risk; and those with more than a 10 percent chance to be high-risk.

The MESA findings indicate that a coronary artery calcium score may not be an efficient screening

tool among low-risk individuals. It is generally accepted that patients who are at high risk should be treated regardless of their coronary artery calcium score, and as a result do not need coronary artery calcium testing for additional risk assessment.

Provided by National Institutes of Health

"We found that when we included the coronary artery calcium score to predict risk, we were better able to identify those who developed serious chest pain or heart attacks. The coronary artery calcium score was most helpful in people who would usually be thought of as intermediate risk," explained Tamar Polonsky, M.D., of Northwestern University, the lead author of the paper. "It can sometimes be hard to know whether to do things such as start patients at intermediate risk on cholesterol-lowering medicine, and so it is possible that the coronary artery calcium score may help physicians and patients decide the best way to control their risk factors."

Coronary artery calcium scanning is not generally recommended as a screening test. Whether it would improve outcomes is unknown and the scans entail additional costs and some risks, such as exposure to small amounts of radiation. One recent study provided some indication of an elevated cancer risk if a calcium score is obtained every five years. Some have suggested that a coronary artery calcium score-guided strategy may actually cost more money and prevent fewer events than simply treating all patients at intermediate risk.

"Physicians should first consider and treat major risk factors, such as high cholesterol and high blood pressure, and address smoking in their patients, because modifying these risk factors will improve outcomes," said Diane Bild, M.D., director of the NHLBI's Prevention and Population Sciences Program, and a coauthor of the paper.

MESA researchers are investigating the early stages of coronary artery disease in various studies. More than 6,000 ethnically diverse men and women from six communities in the United States are participating in MESA. Participants undergo coronary tests such as CT scans, magnetic resonance imaging, ultrasounds, and electrocardiograms.

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